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Stock car racing as popularized by NASCAR has given us many insights into the world of competitive motorsports and, in some respects, into our day-to-day industrial environments.

Some race fans enjoy the sport racing for what it is—drivers and machines pushed to their limits. Others wait for bumping and banging and a big wreck coming out of turn four heading to the finish line. Race fan or not, however, we can learn much about planned/preventive maintenance execution from the modern-day race teams and their pit crews.

**Racing passion**

Stock car racing has always fascinated me. The movies Thunder Road (1958) and Days of Thunder (1990) have a cherished place in my heart, as do historic stock car racing films from the '50s through the '80s. My love for the sport is not a new thing; it spans my childhood days at dirt-track fairground races to more recent times in my professional career, in the pits at the Brickyard 400 in Indianapolis, in modern race shops and at pit crew training and practice sessions.

In fact, over the past 16 years, I've studied numerous NASCAR Cup-level teams and spent hundreds of hours behind the scenes, learning their secrets that we could apply to industrial maintenance and reliability. In the process, I've been fortunate to meet and learn from several true racing legends—Smokey Yunick, Leonard Wood, Donny Allison, Rick Hendrick, Benny Parsons, Ray Evernham, Jeff Hammond and Jeff Gordon to name a few. One thing that has stood out after every meeting, every conversation and every shop visit with these racing giants has been their "passion for competitiveness/their passion for winning." They know each race they are in and they strive to do their very best. While they all can't be winners, they know they have to be "excellent" to even qualify for a race. Then, it's the best of the best that usually win. (OK, sometimes it's luck, being in the right place at the right time that wins the race. But even with luck, it takes a high degree of excellence to be there in the first place.)

**In the pit**

Pit stops always have been important in auto racing in that they always have been intended as routine planned/preventive maintenance events: changing tires, adding fuel, making adjustments, cleaning and giving the drivers something to drink. Beyond that there are always occasional pit stops for repairs and various routine work. Since the '60s, though, pit stops have become a competitive advantage—that is IF you can have a faster pit stop and gain track position. Gaining positions in this way is much better than driving hard and putting cars and drivers at risk to pass others on the track.

What would happen if a modern-day auto racing put crew carried out its pit stops the same way that some plants perform their planned/preventive maintenance?

In the '60s, the Wood Brothers were the first to "choreograph" a pit stop. Their "lightning fast" 20- and 25-second stops were legendary. Eventually, other teams figured out how to make their own pit stops faster and faster. In fact, pit stops of 12 seconds or less are quite common these days. Moreover, top-performing pit crews have become real "rock stars" in the field of racing, second only to the top drivers.

Still, it’s important to keep things in context. Routine pit stops in racing really are planned/ preventive maintenance downtime for the racecars—racecars that generate revenue for their business. Therefore, a pit stop is not about speed as much as it is about doing things right the first time. That’s right! In the overall scheme of things, pit-stop speed is not as important as the accuracy of every pit-stop task. Errors, rework and omissions can hurt a race team; that means lost positions, damages, accidents, injuries, financial losses and more. Consider what would happen if a modern-day auto racing pit crew carried out its pit stops the same way that some plants perform their planned/ preventive maintenance.

**Imagine this**

It’s the final pit stop of the race and the driver expertly brings the racecar down pit road and slides to a stop, much to everyone’s surprise, 10 laps sooner than planned. After he stops, he announces that the car is "handling like a bread truck." He’s not sure what’s wrong, but it must be fixed fast and fixed now!

Hearing all the commotion on their radios, the pit crew members interrupt their break and hurry back to pit road. When they arrive at their pit area, they find only three tires and send the tire carrier back to get another one—or two. (They’re not sure how many tires they might need.) Now the tire changers begin looking for the two race guns (air impact wrenches). They find only one that works but figure they can make do with it. Over the wall they go!

The jack man is still looking for the jack—it's not where he left it after the last pit stop. The gas man finds one full gas can and another leftover from the last pit stop that's still half full. That's all they're able to put into the car since escalating fuel prices have caused the team owners to clamp down on the gas budget. The gas man soon notices that the fuel is going into the fuel cell much slower because the catch can probe is broken and the fuel cell vent is closed. After a quick search, the jack man finds the jack behind a stack of old tires and sprints to the racecar only to trip going over the pit wall. A bit dizzy (but not suffering any debilitating injuries), he jacks up the left side of the car and waits.

The tire changers on the right side of the car have successfully removed all of the lug nuts and are waiting for the jack man to do his thing. Realizing that something is wrong, the jack man tells the "stupid" tire changer to come back to the other side of the car and get these tires off. A brief argument ensues and the jack man decides it's probably best to do the right side tires first. So, he begrudgingly drops the jack and ambles over to the other side of the car, slams the jack down and jacks up the car. Now that the right side tires are finally off, the tire carrier notices that the new right front tire is flat, tosses it over the wall and grabs another. The rear changer flawlessly indexes the new rear tire—and the changer tightens five lug nuts in a record 1.2 seconds! They high-five and pass the race gun to the front tire changer.

The front changer finally gets a good tire on the car and drives home the four lug nuts (he knows there should be five but the inspector doesn't notice one is missing). By this time, the fuel is in the car. The windshield and grille have been cleaned, and the left side tire change is begun as the jack man laments, "I told you we should have done the left side first!" As luck would have it, though, the second race gun appears from the bottom of the toolbox and is in the capable hands of the rear tire changer. Five lug nuts come off each of the front and rear wheels without a hitch. The jack man, however, is struggling with the jack—it won't go up! It's stuck. He yells to someone to toss him the big hammer, whereupon he beats the tar out of the jack and it finally begins to work. Unfortunately, the racecar is too close to the wall and the jack handle hits the wall with each pump. After a heated exchange between the jack man and the driver who "put that stupid car too close to the wall," the jack man gets the car raised up enough with 20 to 30 pumps—that's a record 15 seconds!

Two left-side tires off, two new tires on, the jack drops the car and it stalls! The entire pit crew scowls at the driver who is feverishly trying to start the vehicle. At this instant, the driver, crew chief and engineers decide why the racecar is handling so poorly and announce the plan to make a chassis adjustment. Since the gas man is available, the engineer passes the wrench to him and the crew chief announces "two rounds of wedge down on the right side." After swapping wrenches to get the right one, the gas man begins making the adjustment only to

hear from the pit box "No! No! Turn it the other way, dummy."

By now the pit crew is beat. They sit on the pit wall, waiting for instructions on what to do next. The crew chief looks up from his computer, sees what's happening and yells at the crew to "drop your tools, get off your rears and push the car to get it started!" As the crew pushes the racecar down pit road, it finally starts and makes it back on the track—a 2-minute, 45-second pit stop successfully completed. (Successful? "The car's back on the track isn't it?") The crew throws their tools, hoses and gloves in a pile and promptly goes on break.

One lap later, the driver brings the racecar down pit road again—this time with dangerously loose front wheels. After a faster than normal tire change (once the pit crew had returned from their break) the car gets back in the race. Alas, it runs out of gas 10 laps before the end of the race and posts a solid last-place finish. After the noise of the race dies down, someone notices that the air hose to the front tire changer's race gun had been leaking. Apparently when the flat tire was tossed over the wall, the rim hit the hose causing, a deep gash.

**Back to reality**

Why don't we see auto racing pit stops that look like this example? Because such a team CANNOT compete, no matter how good the racecar, no matter how experienced the driver, no matter how much money is thrown at the team!

In auto racing, much like a capital-intensive business, what makes a competitive team—a winning team—is when everything works together flawlessly. In other words, the equipment, tools, team members, work processes (methods and procedures) and leadership all are focused on common goals.As a business, a team will win or lose together. It simply can't be competitive with high-performing machinery and less-than-stellar maintenance. It just doesn't work that way—at the race track or in an industrial environment.

My sincerest apologies to my friends in NASCAR racing, drivers, crew chiefs, pit crew coaches and pit crew members. You and I know pit stops do not, cannot and will not happen like the hypothetical one described here. Aren't you glad? Sadly, we see a lot of similarities between this imaginary pit stop and how planned/preventive maintenance is carried out in some of our plants and facilities in America—and we wonder why we are struggling to compete. **MT**

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